Check

carpo, # 32321

from here 2021

"Sweet sand"

Probably

Plotopteryon joaquinensis

stubby carpus suggests

flightlessness (as in Manuella

= Plotus joaquinensis 7.1.82 LH

Jewett Sand
NA Murallid
323/2 1.
from Lx 2021
to 5221.6

Paratubo
segments
5322.4

manCalk
5322.4

Relative size of Flightless Murallids

metres

Californeta
length pair
M1 & M2 → 96.3 %

89.4 %

96.5 %

96,4 %

81.7 %

Br. fox
tooth
pair depth → 123 %

→ 108 %

97.5

91.8

Coracoid
length from
scapiofacet
to head
Plototenum → 22.0 mm

88.2

90.7

20.9 mm

Humerus
Gr dist depth
b prox
21.8

91.6

max diameter
93.1

anter
84.4

reduced max
92.1

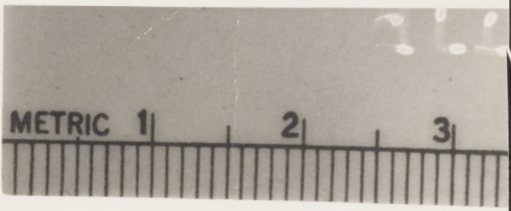
anter
84.4

Ulna
depth bro

83 %

87.9 %

Gr. prox


METRIC 1
2
3

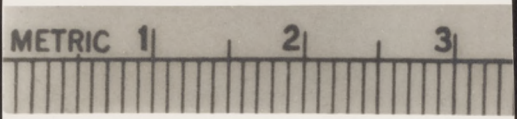
Type of

Plotopterum

joaquinensis Arnaud

LACM no. 8927

ext. View


METRIC 1
2
3

Type q

Plotopterum

Soaquimensis Howard

LACM no. 8927

Dist. view

C1+ loc at Pyramid Hill #481 = LACM 1627-1628?

= loc as given by Kellogg

Sect 14 T 28 S R 29 E Caliente Quad USGS Kern Co. Calif
Lower Mio. with paparian remains (natural brain casts)
Seal skulls & brain casts. Ledges of fossiliferous
concretionary ss Coll. Jan 1930 C. Stock
= LACM 1627-1628?

Feb. 26 1964 LACM 1626 Pyramid Hill (Mitchell Fauls # F256 Ranch
(in same loc. Chelonian F261
mammals F262
Bird loc
June 1963

Center of SE 1/4 Sec. 15, T 28 S, R 29 E, Rio Bravo Ranch
USGS 1954 in loose unconsolidated ss
abundant marine molluscs — some mammal bone
loc is in a south-facing cut on south bank of an east-west
trending ridge. About 50' below the anticline is a light-gray
colored series = ? Walker fm? Visible from road

LACM 1627 Mitchell F 267

Lowest fossiliferous ss ledge on SW face of
Pyramid Hill SW 1/4 Sec 14 R 29 E T 28 S
Rio Bravo Ranch SW Quad USGS 1954

LACM 1628 = Mitchell F 268
Next lighter bed in section at loc 1627
(50-100' up)

Pyramid Hill deposits located 5 miles southwest of Sharktooth Hill — seemingly older. Pyramid Hill sands are assigned to latter part of early Miocene (Harold W. Hoots, Ted L. Bear + Wm. D. Kleinpell, 1959, Geol. of So. Calif., Chap. 2, Geol. of Nat. Provinces, Artale 8 "Geological Summary of the San Joaquin Valley, Calif, pp 113-129, see especially p. 121). These authors place the Vedder Sands lower "early lower Miocene = Zemorrian = Vaqueros.

Sharktooth Hill deposits are Round Mt. silt of Temblor stage of Miocene, shallow water, coastal shells according to Mitchell 1964, Univ. Calif. Publ. Geol. 61; 30.

New genus + species — Plotopterum joaquinensis

Measurements of Coracoid compared recent cormorants

	Nannopterum	Phalacrocorax	P. pygmaeus
a Distance Scaf. facet to head	16.2	23.3	22.0
b Breadth across trios. canal	7.0	11.0	7.4
c Greatest depth from trios. canal through glenoid fac	4.5	6.5	8.0
Ratio b to a	43%	47%	33.6%
" c to b	64%	59%	108%
" c to a	27.8%	27.9%	36%

Howard
6.28.66

Probable new species

Type: Upper end of left coracoid (procoracoid to head), LACM 8927, collected by Dick Bishop, 1963 or 1964.

Locality: LACM loc. 1626, Sand Quarry (Vedder Sands formation), Pyramid Hill, Kern County.

Description: Area between procoracoid and head narrow anteroposteriorly, but markedly thickened in lateral dimension; lower half of triosseal canal convex, the convexity separated from the glenoid facet by a distinct vertical groove; head thick, bending forward beyond triosseal canal and furcular facet overhanging the canal; triangular shaped groove cutting head and separating the large, flat, furcular facet from the brachial tuberosity; neck heavy, only slightly depressed adjacent to coracohumeral surface; coracohumeral surface broad, with relatively straight contours; flaring slightly fromglenoid facet to head; glenoid facet blending below into scapular facet, the latter flat, not cupshaped; procoracoid broken but apparently short; no coracoidal fenestra below procoracoid.

Discussion: Although superficially loonlike in the forward-bent head narrow triosseal canal and rather convex neck area, actual relationships seem to lie closer to the cormorants in the flat scapular facet, blending into the glenoid facet, and in the groove between the furcular facet and the brachial tuberosity (much less marked in the Recent forms however, than in the fossil). There is also in some cormorant specimens, a slight indication of pneumaticity in the triosseal canal adjacent to the glenoid facet in the area marked by a distinct groove in the fossil. On the basis of these characters, the fossil is tentatively referred to the Pelecaniformes.

Diagnosis: Narrow, heavy coracoid with head ~~bent forward~~, furcular facet separated from brachial tuberosity by deep triangular groove; triosseal canal markedly convex near procoracoid, with deep cut groove ~~immediately adjacent to~~ glenoid fact.

(Other cormorant-like characters: reduced procoracoid, deep longitudinal groove in triosseal canal at border of glenoid facet (slightly developed in some cormorant specimens; anterior placement of furcular facet)

Element is highly modified -- more columnar (narrow but deep); modifications suggest those of penguins and flightless auks that use wings to swim. Note that the type of Gaviella pusilla may not be a loon, the trochlear crest is much more prominent (suggesting cormorants). G. pusilla, is of course too small for this Pyramid Hill bird, but should be studied for possible relationship

Description: Presumed portion of coracoid (from procoracoid & head) approximately equal in length to corresponding portion of coracoid of P. punctillatus, but markedly ~~[illegible]~~ narrower across twisted canal; canal area smaller above procoracoid and round in anterior border; narrow, deep groove parallels glenoid facet internally; head overhangs sharp anterior & internally; forward-facing lunate facet flat, irregular in outline, but more round than oval. Deep groove separates this facet from fracture tubercle; groove wider below, narrowing above;

~~Bibl~~

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10pt

A NEW AVIAN FOSSIL FROM KERN COUNTY, CALIFORNIA

8pt

HILDEGARDE HOWARD

Los Angeles County Museum of Natural History

6pt

Exposition Park

c/lc

Los Angeles, California 90007

Published 1969
Condor 71(1): 69—

CARDS MADE

A NEW AVIAN FOSSIL FROM KERN COUNTY, CALIFORNIA

Hildegarde Howard

The first avian fossil from the Pyramid Hill sands of the San Joaquin Valley, Kern County, California, was presented to the Los Angeles County Museum of Natural History in 1964 by Mr. Dick Bishop of Bakersfield, California. The specimen was recovered from a sand quarry discovered by Bishop, which he and Ed Mitchell of the Museum worked extensively in 1961. The site is recorded as Los Angeles County Museum of Natural History (LACM) locality 1626. Fish, chelonian, and mammalian remains, as well as invertebrates, have come from the same locality, but have not yet been reported upon. From other Pyramid Hill sites, presumably of the same age, a cetacean has been described (Kellogg, Smithsonian Misc. Coll. 87 (2): 1-11, 1932) and mollusks identified (Barbat, in Kellogg, op. cit., p. 1, and Addicott, U.S. Geol. Surv. Prof. Paper 525-C:104, 1965). On the basis of the molluscan identifications, the age of the Pyramid Hill sands is placed as early Miocene (Vaqueros "formation" or "stage"). The fauna is, therefore, older than that of the well-known Sharktooth Hill deposits of the San Joaquin Valley, which contain a middle Miocene marine vertebrate assemblage of more than fifty species, ten of which are avian (see Mitchell, Special Publ. Kern Co. Historical Soc. and Kern Co. Mus., i-vi + 45 pp., 1965; and Howard, Los Angeles Co. Mus. Contrib. Sci., 114: 1-11, 1966).

The Pyramid Hill avian bone is an upper end of left coracoid. In the triangular outline of the head, with space between the brachial tuberosity and the forward-directed furcular facet,

the bone shows a basic relationship to the coracoid in cormorants and anhingas. The shape of the procoracoid and scapular facet, and the flattening of the shaft adjacent to the scapular facet are also cormorantlike characters. Other features of the bone, however, show modifications paralleling those found in divers, such as penguins and auks, in which the head overhangs the shaft and the triosseal area is narrowed anteroposteriorly, and swollen in its lower portion.

The specimen undoubtedly represents an undescribed form, which is hereby named.

Plotopterum, new genus

(Plot, swimming; pterum from pteron, wing)

Type: Plotopterum joaquinensis, new species.

Diagnosis: Narrow, heavy coracoid with head overhanging triosseal canal; antero-internal contour below head rounded; space between furcular facet and brachial tuberosity a deep, triangular groove extending to upper surface of head; lower half of triosseal canal markedly convex, with deep-cut longitudinal groove separating convexity from glenoid facet; neck heavy, only slightly depressed adjacent to coracohumeral surface.

Plotopterum joaquinensis, new species

Figure 1

Type: Upper end of left coracoid, LACM no. 8927, collected by Dick Bishop, 1964.

Locality and age: LACM locality 1626; center of SE¼ of Sect 15, T 28 S, R 29 E, Rio Bravo Rancho quadrangle, USGS, 1954; in unconsolidated sandstone, 50 feet above light gray (Walker?) formation. Early Miocene (Vaqueros).

Diagnosis: See Generic Diagnosis.

Description: Coracoid close in size to that of Phalacrocorax penicillatus in measurement from head to procoracoid, but markedly narrower in anteroposterior dimension, and round, not angular, in anterointernal contour; triosseal canal swollen immediately above procoracoid; deep, narrow groove paralleling glenoid facet internally; head overhanging shaft anterointernally; forward-facing furcular facet flat, irregular in outline, but more round than oval; deep groove separating this facet from brachial tuberosity, wider on internal face, narrowing proximally; bicipital attachment a deep, round pit; neck thick, rounded and smoothly contoured; below neck, at level of middle of glenoid facet, shaft becoming angular at antero-external edge, and area below glenoid and scapular facets flattened; glenoid facet slightly depressed, blending into shaft without flare, and blending below into scapular facet; scapular facet flat, not cup-shaped; coracohumeral surface rising almost vertically above glenoid facet, broad, centrally depressed, irregular in shape, but more oval than crescentic; procoracoid thick and apparently short (tip broken).

Measurements: Distance from scapular facet to tip of head, 22.0 mm; breadth below head across triosseal canal, 7.4 mm; greatest depth from triosseal canal through glenoid facet, 8.0 mm.

DISCUSSION

The swelling of the lower part of the triosseal canal in the fossil coracoid, the narrowness and thickness of the bone in this area and through the neck, and the anterior overhang of the head are characters found in marine birds, such as the penguins and

alcids. Although taxonomically unrelated, these two groups of birds are alike in the modification of the wing bones toward a flipper-like condition adapted to under water "flight." Even in those alcids still capable of aerial flight, the coracoid has similar characters. The swelling of the lower triosseal region tends to narrow and deepen the passageway for the pectoral tendon, and presumably afforded support to the tendon so as to strengthen the upstroke of the wing in swimming. The channel is even more constricted and deeper in the alcids and penguins than in Plotopterum, suggesting that the fossil bird may not have been the equal of these other birds as a swimmer.

It is difficult to determine from this incomplete coracoid whether or not the extinct bird had completely lost the power of aerial flight. The modifications of the bone are entirely different from those found in the coracoid of the flightless cormorant, Nannopterum. In Nannopterum the modifying process has been one of degeneration, whereas the evidence indicates that in Plotopterum the wing had assumed a secondary function as a strong swimming organ. The fact that the modifications of the coracoid parallel those of the coracoid of penguins and auks, suggests that the wing elements were shorter and more flattened in the fossil than in the cormorants and anhingas. Obviously Plotopterum represents a trend in aquatic adaptation sufficiently distinct from either of these two existing groups to warrant the designation of a separate family, to be known as the Plotopteridae.

~~Los Angeles County Museum of Natural History, February 13, 1968~~
Accepted for publication 4 March 1968.

Legend for illustrations

FIGURE

Fig. 1. Type coracoid of Plotopterum joaquinensis, n. sp., LACM 8927. A, internal view; B, external view. X 2